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10/822,440	04/12/2004	Wai Ming Choi	072545-0083	1434

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EXAMINER

PIZIALI, ANDREW T

ART UNIT

PAPER NUMBER

1771

DATE MAILED: 05/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/822,440

Applicant(s)

CHOI ET AL.

Examiner

Andrew T. Piziali

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 21-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7/9/04 & 10/6/04.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group I, claims 1-20, in the reply filed on 3/27/2006, is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Claims 21-30 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 13-14 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 01/43850 to Pierce in view of USPN 6,291,552 to Dong.

Regarding claims 13-14 and 19-20, Pierce discloses a nonwoven filter media comprising a layer of glass wool fibers combined with chopped glass fibers (see entire document including page 2, lines 23-25). Pierce discloses that the chopped glass fibers may be present in the range of about 5 to 40% by weight and that the glass wool fibers may be present in the range of about 60 to 95% by weight (page 2, lines 27-29). Pierce discloses that the glass wool fibers may have a diameter in the range of 0.1 to 5.0 microns (page 6, lines 12-14). Pierce discloses that the chopped glass fibers may have a diameter in the range of 5.0 to 9.0 microns (page 7, lines 22-24). Pierce discloses that the filter media may be a wet laid filter media (page 14, lines 17-18).

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Pierce discloses that the number of plies can vary from approximately 1 to 10 plies (page 10, lines 30-31). Therefore, the top ply can be considered to read on the claimed filtration layer and one or more underlying plies can be considered to read on the claimed support layer.

Pierce does not appear to mention varying the pH of the nonwoven glass layer during the wet laid process, but Dong discloses that it is known in the wet laid nonwoven glass art to sequence the addition of oppositely charged viscosity modifiers so that the glass fibers are initially dispersed and then attracted together resulting in a pH in the range of from about 5 to about 10 and resulting in a nonwoven glass layer with uniform weight (see entire document including column 2, lines 20-33 and column 6, lines 58-64). It would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the pH of the nonwoven glass layer during the wet laid process, as taught by Dong, because the nonwoven filter media would advantageously possess a uniform weight.

Pierce does not mention the gamma value, but considering that the nonwoven filter media taught by the applied prior art is substantially identical to the claimed nonwoven filter media in structure and considering that the nonwoven filter media taught by the applied prior art is made by a substantially identical wet laid process, it appears that the nonwoven filter media inherently possesses the claimed gamma value.

The Patent and Trademark Office can require applicants to prove that prior art products do not necessarily or inherently possess characteristics of claimed products where claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes; burden of proof is on applicants where rejection based on inherency under 35 U.S.C. § 102 or on prima facie obviousness under 35 U.S.C. § 103, jointly

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or alternatively, and Patent and Trademark Office's inability to manufacture products or to obtain and compare prior art products evidences fairness of this rejection, *In re Best, Bolton, and Shaw*, 195 USPQ 431 (CCPA 1977).

Regarding claim 14, Pierce discloses that the glass wool fibers of each ply may have a diameter in the range of 0.1 to 5.0 microns (page 6, lines 12-14).

Regarding claims 19 and 20, Pierce discloses that the glass wool fibers may be combined with chopped glass fibers forming a filtration layer (see entire document including page 2, lines 23-25).

Regarding claim 20, Pierce discloses that the chopped glass fibers may be present in the range of about 5 to 40% by weight and the glass wool fibers may be present in the range of about 60 to 95% by weight (page 2, lines 27-29).

4. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 01/43850 to Pierce in view of USPN 6,291,552 to Dong as applied to claims 13-14 and 19-20 above, and further in view of USPN 4,102,785 to Head et al. (hereinafter referred to as Head).

Pierce does not appear to mention the apparent density of the web, therefore, it would have been obvious to look to the prior art for conventional web densities. Head provides this conventional teaching showing that it is known in the filter art to use a fiber density of about 0.15 to 0.25 g/cc (see column 4, lines 52-55). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the filter media with a fiber density of 0.15 to 0.25 g/cc, as taught by Head, motivated by the expectation of successfully practicing the invention of Pierce.

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5. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 01/43850 to Pierce in view of USPN 6,291,552 to Dong as applied to claims 13-14 and 19-20 above, and further in view of USPN 6,749,753 to Yamaguchi et al. (hereinafter referred to as Yamaguchi).

Pierce discloses that the number of plies can vary from approximately 1 to 10 plies (page 10, lines 30-31). Therefore, the top ply can be considered to read on the claimed filtration layer and one or more underlying plies can be considered to read on the claimed support layer. Pierce does not appear to mention using a larger fiber diameter in one of the supporting plies, but Yamaguchi discloses that it is known in the filtration art to vary the fiber diameter of adjacent plies to increase filtration accuracy and increase filtration life (see entire document including column 2, lines 29-44). Yamaguchi discloses that the larger fibers may have a diameter of 1.1 to 20 times as large as the smaller diameter (column 6, lines 38-49). Considering that Pierce discloses that the glass wool fibers of each ply may have a diameter in the range of 0.1 to 5.0 microns (page 6, lines 12-14), it would have been obvious to use fibers with a diameter of 0.69 microns in one ply and fibers with a diameter of 4.2 microns in at least one of the supporting plies, because the filter would possess increased filtration accuracy and increased filtration life.

6. Claims 1-17 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 01/43850 to Pierce in view of USPN 6,291,552 to Dong in view of USPN 6,420,024 to Perez et al. (hereinafter referred to as Perez).

Regarding claims 1-17 and 19-20, Pierce discloses a nonwoven filter media comprising a layer of glass wool fibers combined with chopped glass fibers (see entire document including page 2, lines 23-25). Pierce discloses that the chopped glass fibers may be present in the range of about 5 to 40% by weight and that the glass wool fibers may be present in the range of about

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60 to 95% by weight (page 2, lines 27-29). Pierce discloses that the glass wool fibers may have a diameter in the range of 0.1 to 5.0 microns (page 6, lines 12-14). Pierce discloses that the chopped glass fibers may have a diameter in the range of 5.0 to 9.0 microns (page 7, lines 22-24). Pierce discloses that the filter media may be a wet laid filter media (page 14, lines 17-18).

Pierce does not appear to mention varying the pH of the nonwoven glass layer during the wet laid process, but Dong discloses that it is known in the wet laid nonwoven glass art to sequence the addition of oppositely charged viscosity modifiers so that the glass fibers are initially dispersed and then attracted together resulting in a pH in the range of from about 5 to about 10 and resulting in a nonwoven glass layer with uniform weight (see entire document including column 2, lines 20-33 and column 6, lines 58-64). It would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the pH of the nonwoven glass layer during the wet laid process, as taught by Dong, because the nonwoven filter media would advantageously possess a uniform weight.

Pierce appears to be silent with regards to a specific surface area, therefore, it would have been obvious to look to the prior art for conventional surfaces areas. Perez provides this conventional teaching showing that it is known in the filtration art to use a surface area of greater than $0.25 \text{ m}^2/\text{gm}$, typically about 0.5 to $30 \text{ m}^2/\text{g}$ (see column 2, lines 8-21). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the surface area from about 0.5 to $30 \text{ m}^2/\text{g}$, motivated by the expectation of successfully practicing the invention of Pierce.

Pierce does not mention the gamma value, but considering that the nonwoven filter media taught by the applied prior art is substantially identical to the claimed nonwoven filter media in

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structure and considering that the nonwoven filter media taught by the applied prior art is made by a substantially identical wet laid process, it appears that the nonwoven filter media inherently possesses the claimed gamma value.

Regarding claims 2-3, 9-10 and 14, Pierce discloses that the glass wool fibers of each ply may have a diameter in the range of 0.1 to 5.0 microns (page 6, lines 12-14).

Regarding claims 4-6 and 19-20, Pierce discloses that the glass wool fibers may be combined with chopped glass fibers forming a filtration layer (see entire document including page 2, lines 23-25).

Regarding claims 6 and 20, Pierce discloses that the chopped glass fibers may be present in the range of about 5 to 40% by weight and the glass wool fibers may be present in the range of about 60 to 95% by weight (page 2, lines 27-29).

Regarding claims 7 and 11, Pierce discloses that the filter media may be a wet laid filter media (page 14, lines 17-18).

Regarding claims 8-12 and 16-17, Pierce does not appear to mention the apparent density of the web, but considering that the nonwoven filter media taught by the applied prior art possesses an identical surface area and is made with an identical wet laid process producing a substantially uniform web, it appears that the apparent density of the web is inherently at least about 0.15 g/cc.

Regarding claims 13-17 and 19-20, Pierce discloses that the number of plies can vary from approximately 1 to 10 plies (page 10, lines 30-31). Therefore, the top ply can be considered to read on the claimed filtration layer and one or more underlying plies can be considered to read on the claimed support layer.

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7. Claims 8-12 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 01/43850 to Pierce in view of USPN 6,291,552 to Dong in view of USPN 6,420,024 to Perez as applied to claims 1-17 and 19-20 above, and further in view of USPN 4,102,785 to Head.

Pierce does not appear to mention the apparent density of the web, but considering that the nonwoven filter media taught by the applied prior art possesses an identical surface area and is made with an identical wet laid process producing a substantially uniform web, it appears that the apparent density of the web is inherently at least about 0.15 g/cc. In the event that it is shown that the apparent density of the web is not inherently about 0.15 to 0.21 g/cc, Head discloses that it is known and typical in the filter art to use a fiber density of about 0.15 to 0.25 g/cc (see column 4, lines 52-55). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the filter media with a fiber density of 0.15 to 0.25 g/cc, as taught by Head, because it is understood by one of ordinary skill in the art that the apparent density effects a property such as filtration efficiency and because it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

8. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 01/43850 to Pierce in view of USPN 6,291,552 to Dong in view of USPN 6,420,024 to Perez as applied to claims 1-17 and 19-20 above, and further in view of USPN 6,749,753 to Yamaguchi.

Pierce discloses that the number of plies can vary from approximately 1 to 10 plies (page 10, lines 30-31). Therefore, the top ply can be considered to read on the claimed filtration layer and one or more underlying plies can be considered to read on the claimed support layer. Pierce does not appear to mention using a larger fiber diameter in one of the supporting plies, but

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Yamaguchi discloses that it is known in the filtration art to vary the fiber diameter of adjacent plies to increase filtration accuracy and increase filtration life (see entire document including column 2, lines 29-44). Yamaguchi discloses that the larger fibers may have a diameter of 1.1 to 20 times as large as the smaller diameter (column 6, lines 38-49). Considering that Pierce discloses that the glass wool fibers of each ply may have a diameter in the range of 0.1 to 5.0 microns (page 6, lines 12-14), it would have been obvious to use fibers with a diameter of 0.69 microns in one ply and fibers with a diameter of 4.2 microns in at least one of the supporting plies, because the filter would possess increased filtration accuracy and increased filtration life.

9. Claims 13-14 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 01/43850 to Pierce in view of USPN 4,523,995 to Pall et al. (hereinafter referred to as Pall).

Regarding claims 13-14 and 19-20, Pierce discloses a nonwoven filter media comprising a layer of glass wool fibers combined with chopped glass fibers (see entire document including page 2, lines 23-25). Pierce discloses that the chopped glass fibers may be present in the range of about 5 to 40% by weight and that the glass wool fibers may be present in the range of about 60 to 95% by weight (page 2, lines 27-29). Pierce discloses that the glass wool fibers may have a diameter in the range of 0.1 to 5.0 microns (page 6, lines 12-14). Pierce discloses that the chopped glass fibers may have a diameter in the range of 5.0 to 9.0 microns (page 7, lines 22-24). Pierce discloses that the filter media may be a wet laid filter media (page 14, lines 17-18). Pierce discloses that the number of plies can vary from approximately 1 to 10 plies (page 10, lines 30-31). Therefore, the top ply can be considered to read on the claimed filtration layer and one or more underlying plies can be considered to read on the claimed support layer.

Pierce does not appear to mention varying the pH of the nonwoven glass layer during the wet laid process, but Pall discloses that it is known in the wet laid nonwoven glass art to vary the resulting pH in the range of from about 7 to about 10 to result in a nonwoven glass layer with excellent strength and enhanced particulate removal efficiency (see entire document including column 2, lines 34-46, the paragraph bridging columns 5 and 6, and column 6, lines 52-63). It would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the pH of the nonwoven glass layer during the wet laid process to about 7 to about 10, as taught by Pierce, because the nonwoven filter media would advantageously possess excellent strength and enhanced particulate removal efficiency.

Pierce does not mention the gamma value, but considering that the nonwoven filter media taught by the applied prior art is substantially identical to the claimed nonwoven filter media in structure and considering that the nonwoven filter media taught by the applied prior art is made by a substantially identical wet laid process, it appears that the nonwoven filter media inherently possesses the claimed gamma value.

Regarding claim 14, Pierce discloses that the glass wool fibers of each ply may have a diameter in the range of 0.1 to 5.0 microns (page 6, lines 12-14).

Regarding claims 19 and 20, Pierce discloses that the glass wool fibers may be combined with chopped glass fibers forming a filtration layer (see entire document including page 2, lines 23-25).

Regarding claim 20, Pierce discloses that the chopped glass fibers may be present in the range of about 5 to 40% by weight and the glass wool fibers may be present in the range of about 60 to 95% by weight (page 2, lines 27-29).

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10. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 01/43850 to Pierce in view of USPN 4,523,995 to Pall as applied to claims 13-14 and 19-20 above, and further in view of USPN 4,102,785 to Head.

Pierce does not appear to mention the apparent density of the web, therefore, it would have been obvious to look to the prior art for conventional web densities. Head provides this conventional teaching showing that it is known in the filter art to use a fiber density of about 0.15 to 0.25 g/cc (see column 4, lines 52-55). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the filter media with a fiber density of 0.15 to 0.25 g/cc, as taught by Head, motivated by the expectation of successfully practicing the invention of Pierce.

11. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 01/43850 to Pierce in view of USPN 4,523,995 to Pall as applied to claims 13-14 and 19-20 above, and further in view of USPN 6,749,753 to Yamaguchi.

Pierce discloses that the number of plies can vary from approximately 1 to 10 plies (page 10, lines 30-31). Therefore, the top ply can be considered to read on the claimed filtration layer and one or more underlying plies can be considered to read on the claimed support layer. Pierce does not appear to mention using a larger fiber diameter in one of the supporting plies, but Yamaguchi discloses that it is known in the filtration art to vary the fiber diameter of adjacent plies to increase filtration accuracy and increase filtration life (see entire document including column 2, lines 29-44). Yamaguchi discloses that the larger fibers may have a diameter of 1.1 to 20 times as large as the smaller diameter (column 6, lines 38-49). Considering that Pierce discloses that the glass wool fibers of each ply may have a diameter in the range of 0.1 to 5.0

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microns (page 6, lines 12-14), it would have been obvious to use fibers with a diameter of 0.69 microns in one ply and fibers with a diameter of 4.2 microns in at least one of the supporting plies, because the filter would possess increased filtration accuracy and increased filtration life.

12. Claims 1-17 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 01/43850 to Pierce in view of USPN 4,523,995 to Pall in view of USPN 6,420,024 to Perez.

Regarding claims 1-17 and 19-20, Pierce discloses a nonwoven filter media comprising a layer of glass wool fibers combined with chopped glass fibers (see entire document including page 2, lines 23-25). Pierce discloses that the chopped glass fibers may be present in the range of about 5 to 40% by weight and that the glass wool fibers may be present in the range of about 60 to 95% by weight (page 2, lines 27-29). Pierce discloses that the glass wool fibers may have a diameter in the range of 0.1 to 5.0 microns (page 6, lines 12-14). Pierce discloses that the chopped glass fibers may have a diameter in the range of 5.0 to 9.0 microns (page 7, lines 22-24). Pierce discloses that the filter media may be a wet laid filter media (page 14, lines 17-18).

Pierce does not appear to mention varying the pH of the nonwoven glass layer during the wet laid process, but Pall discloses that it is known in the wet laid nonwoven glass art to vary the resulting pH in the range of from about 7 to about 10 to result in a nonwoven glass layer with excellent strength and enhanced particulate removal efficiency (see entire document including column 2, lines 34-46, the paragraph bridging columns 5 and 6, and column 6, lines 52-63). It would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the pH of the nonwoven glass layer during the wet laid process to about 7 to about 10, as taught by Pierce, because the nonwoven filter media would advantageously possess excellent strength and enhanced particulate removal efficiency.

Pierce appears to be silent with regards to a specific surface area, therefore, it would have been obvious to look to the prior art for conventional surfaces areas. Perez provides this conventional teaching showing that it is known in the filtration art to use a surface area of greater than $0.25 \text{ m}^2/\text{gm}$, typically about 0.5 to $30 \text{ m}^2/\text{g}$ (see column 2, lines 8-21). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the surface area from about 0.5 to $30 \text{ m}^2/\text{g}$, motivated by the expectation of successfully practicing the invention of Pierce.

Pierce does not mention the gamma value, but considering that the nonwoven filter media taught by the applied prior art is substantially identical to the claimed nonwoven filter media in structure and considering that the nonwoven filter media taught by the applied prior art is made by a substantially identical wet laid process, it appears that the nonwoven filter media inherently possesses the claimed gamma value.

Regarding claims 2-3, 9-10 and 14, Pierce discloses that the glass wool fibers of each ply may have a diameter in the range of 0.1 to 5.0 microns (page 6, lines 12-14).

Regarding claims 4-6 and 19-20, Pierce discloses that the glass wool fibers may be combined with chopped glass fibers forming a filtration layer (see entire document including page 2, lines 23-25).

Regarding claims 6 and 20, Pierce discloses that the chopped glass fibers may be present in the range of about 5 to 40% by weight and the glass wool fibers may be present in the range of about 60 to 95% by weight (page 2, lines 27-29).

Regarding claims 7 and 11, Pierce discloses that the filter media may be a wet laid filter media (page 14, lines 17-18).

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Regarding claims 8-12 and 16-17, Pierce does not appear to mention the apparent density of the web, but considering that the nonwoven filter media taught by the applied prior art possesses an identical surface area and is made with an identical wet laid process producing a substantially uniform web, it appears that the apparent density of the web is inherently at least about 0.15 g/cc.

Regarding claims 13-17 and 19-20, Pierce discloses that the number of plies can vary from approximately 1 to 10 plies (page 10, lines 30-31). Therefore, the top ply can be considered to read on the claimed filtration layer and one or more underlying plies can be considered to read on the claimed support layer.

13. Claims 8-12 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 01/43850 to Pierce in view of USPN 4,523,995 to Pall in view of USPN 6,420,024 to Perez as applied to claims 1-17 and 19-20 above, and further in view of USPN 4,102,785 to Head.

Pierce does not appear to mention the apparent density of the web, but considering that the nonwoven filter media taught by the applied prior art possesses an identical surface area and is made with an identical wet laid process producing a substantially uniform web, it appears that the apparent density of the web is inherently at least about 0.15 g/cc. In the event that it is shown that the apparent density of the web is not inherently about 0.15 to 0.21 g/cc, Head discloses that it is known and typical in the filter art to use a fiber density of about 0.15 to 0.25 g/cc (see column 4, lines 52-55). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the filter media with a fiber density of 0.15 to 0.25 g/cc, as taught by Head, because it is understood by one of ordinary skill in the art that the

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apparent density effects a property such as filtration efficiency and because it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

14. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 01/43850 to Pierce in view of USPN 4,523,995 to Pall in view of USPN 6,420,024 to Perez as applied to claims 1-17 and 19-20 above, and further in view of USPN 6,749,753 to Yamaguchi.

Pierce discloses that the number of plies can vary from approximately 1 to 10 plies (page 10, lines 30-31). Therefore, the top ply can be considered to read on the claimed filtration layer and one or more underlying plies can be considered to read on the claimed support layer. Pierce does not appear to mention using a larger fiber diameter in one of the supporting plies, but Yamaguchi discloses that it is known in the filtration art to vary the fiber diameter of adjacent plies to increase filtration accuracy and increase filtration life (see entire document including column 2, lines 29-44). Yamaguchi discloses that the larger fibers may have a diameter of 1.1 to 20 times as large as the smaller diameter (column 6, lines 38-49). Considering that Pierce discloses that the glass wool fibers of each ply may have a diameter in the range of 0.1 to 5.0 microns (page 6, lines 12-14), it would have been obvious to use fibers with a diameter of 0.69 microns in one ply and fibers with a diameter of 4.2 microns in at least one of the supporting plies, because the filter would possess increased filtration accuracy and increased filtration life.

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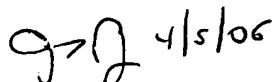
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew T. Piziali whose telephone number is (571) 272-1541. The examiner can normally be reached on Monday-Friday (8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (571) 272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

atp


ANDREW T. PIZIALI
PATENT EXAMINER